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**SYSTEM AND METHOD FOR MITIGATING THE MOBILE PHONE
NUISANCE FACTOR**

BACKGROUND OF THE INVENTION

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1. Technical Field:

The present invention relates to an improved data processing system. In particular, the present invention relates to a method, apparatus, and computer instructions
10 for mitigating the mobile phone nuisance factor.

2. Description of Related Art:

Mobile phone systems refer to communications systems, especially the Advance Mobile Phone Service
15 (AMPS) that divide a geographic region into sections, called cells. The purpose of this division is to make the most use out of a limited number of transmission frequencies. Each connection, or conversation, requires its own dedicated frequency, and the total number of
20 available frequencies is about 1,000. To support more than 1,000 simultaneous conversations, mobile systems allocate a set number of frequencies for each cell. Two cells can use the same frequency for different conversations so long as the cells are not adjacent to
25 each other.

For digital communications, several competing mobile systems exist, including Global System for Mobile Communications (GSM) and Code-Division Multiple Access (CDMA).

30 GSM is one of the leading digital mobile systems. GSM uses narrowband Time Division Multiple Access (TDMA), which allows eight simultaneous calls on the same radio

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frequency. GSM was first introduced in 1991. As of the end of 1997, GSM service was available in more than 100 countries and has become the standard in Europe and Asia.

CDMA is a digital mobile technology that uses
5 spread-spectrum techniques. Unlike competing systems, such as GSM, that use TDMA, CDMA does not assign a specific frequency to each user. Instead, every channel uses the full available spectrum. Individual
10 conversations are encoded with a pseudo-random digital sequence. CDMA is a military technology first used during World War II by the English allies to foil German attempts at jamming transmissions. The allies decided to transmit over several frequencies, instead of one, making it difficult for the Germans to pick up the complete
15 signal.

Mobile phones have proven to be a very beneficial tool for people to exchange information when away from the home or office. At the same time mobile telephones are becoming a public nuisance due to the phones ringing
20 in inappropriate places and people holding conversations on the phones in places such as theatres and restaurants.

One solution to mobile phone nuisance is a jamming device for mobile phone signals that disrupts the reception of the signal at the mobile phone, making it
25 impossible to receive service from the mobile network. These devices have been used in Japan and other places. A permit is usually required in order to use this device and it is currently illegal to use such a device in the U.S. When this device is used, functions such as Short
30 Messaging Service (SMS), email, Internet access, and mailbox access are all disabled.

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Therefore, it would be advantageous to have an improved method, apparatus, and computer instructions for enforcing a policy governing the operation of mobile phones when located in a public establishment or a public space.

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SUMMARY OF THE INVENTION

The present invention provides a method, apparatus, and computer implemented instructions for mitigating the mobile phone nuisance factor. The present invention causes a mobile phone to activate an "In-Public-Use" profile when in a public establishment, which has a policy for mobile phone usage. A transmitter in the public establishment broadcasts an external control signal that contains an encoded command. The circuitry, or processor instructions, in a mobile phone decodes the command and activates the profile with the identified settings from the command. When the profile is activated, an icon is displayed indicating that the profile is active. Additionally, the "In-Public-Use" profile is deactivated when the mobile phone leaves the range of the signal and the previous settings of the mobile phone are enabled.

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BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

Figure 1 depicts a pictorial representation of a data processing system in which the present invention may be implemented;

Figure 2 is a block diagram of a data processing system that may be implemented in accordance with a preferred embodiment of the present invention;

Figure 3 is a block diagram of a telephone device that may be implemented in accordance with a preferred embodiment of the present invention;

Figure 4 is a block diagram illustrating a method to mitigate the mobile phone nuisance factor in accordance with a preferred embodiment of the present invention;

Figures 5A - 5C display block diagrams of three mobile phones in accordance with a preferred embodiment of the present invention;

Figure 6 is a flowchart of the process for a mobile phone entering a public establishment in accordance with a preferred embodiment of the present invention; and

Figure 7 is a flowchart of the process for a mobile phone exiting a public establishment in accordance with a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to the figures and in particular with reference to **Figure 1**, a pictorial representation of a data processing system in which the present invention may be implemented is depicted in accordance with a preferred embodiment of the present invention. A computer **100** is depicted which includes system unit **102**, video display terminal **104**, keyboard **106**, storage devices **108**, which may include floppy drives and other types of permanent and removable storage media, and mouse **110**. Additional input devices may be included with personal computer **100**, such as, for example, a joystick, touch pad, touch screen, trackball, microphone, and the like. Computer **100** is connected to transmitter **112**, which may transmit signals used to activate profiles to mitigate nuisances from mobile phones. The control of the transmission of the signal is provided through computer **100** in these examples.

Computer **100** can be implemented using any suitable computer, such as an IBM RS/6000 computer or IntelliStation computer, which are products of International Business Machines Corporation, located in Armonk, New York. Although the depicted representation shows a computer, other embodiments of the present invention may be implemented in other types of data processing systems, such as a network computer. Computer **100** also preferably includes a graphical user interface (GUI) that may be implemented by means of systems software residing in computer readable media in operation within computer **100**.

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With reference now to **Figure 2**, a block diagram of a data processing system is shown in which the present invention may be implemented. Data processing system **200** is an example of a computer, such as computer **100** in **Figure 1**, in which code or instructions implementing the processes of the present invention may be located.

Data processing system **200** employs a peripheral component interconnect (PCI) local bus architecture. Although the depicted example employs a PCI bus, other bus architectures such as Accelerated Graphics Port (AGP) and Industry Standard Architecture (ISA) may be used. Processor **202** and main memory **204** are connected to PCI local bus **206** through PCI bridge **208**. PCI bridge **208** also may include an integrated memory controller and cache memory for processor **202**. Additional connections to PCI local bus **206** may be made through direct component interconnection or through add-in boards. In the depicted example, local area network (LAN) adapter **210**, small computer system interface SCSI host bus adapter **212**, and expansion bus interface **214** are connected to PCI local bus **206** by direct component connection. In contrast, audio adapter **216**, graphics adapter **218**, and transmitter adapter **219** are connected to PCI local bus **206** by add-in boards inserted into expansion slots. Transmitter adapter **219** may be used to control transmissions of signals from a transmitter, such as transmitter **112** in **Figure 1**.

Expansion bus interface **214** provides a connection for a keyboard and mouse adapter **220**, modem **222**, and additional memory **224**. SCSI host bus adapter **212** provides a connection for hard disk drive **226**, tape drive **228**, and CD-ROM drive **230**. Typical PCI local bus implementations

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will support three or four PCI expansion slots or add-in connectors.

An operating system runs on processor **202** and is used to coordinate and provide control of various components within data processing system **200** in **Figure 2**. The operating system may be a commercially available operating system such as Windows 2000, which is available from Microsoft Corporation. Instructions for the operating system and applications or programs are located on storage devices, such as hard disk drive **226**, and may be loaded into main memory **204** for execution by processor **202**. These instructions may include programs or other code used to control transmissions for managing profiles in mobile phones, such as those transmitted by transmitter **112** in Figure 1.

Those of ordinary skill in the art will appreciate that the hardware in **Figure 2** may vary depending on the implementation. Other internal hardware or peripheral devices, such as flash ROM (or equivalent nonvolatile memory) or optical disk drives and the like, may be used in addition to or in place of the hardware depicted in **Figure 2**. Also, the processes of the present invention may be applied to a multiprocessor data processing system.

For example, data processing system **200**, if optionally configured as a network computer, may not include SCSI host bus adapter **212**, hard disk drive **226**, tape drive **228**, and CD-ROM **230**, as noted by dotted line **232** in **Figure 2** denoting optional inclusion. In that case, the computer, to be properly called a client computer, must include some type of network communication interface, such as LAN adapter **210**, modem **222**, or the

like. As another example, data processing system **200** may be a stand-alone system configured to be bootable without relying on some type of network communication interface, whether or not data processing system **200** comprises some type of network communication interface. As a further example, data processing system **200** may be a personal digital assistant (PDA), which is configured with ROM and/or flash ROM to provide non-volatile memory for storing operating system files and/or user-generated data.

The depicted example in **Figure 2** and above-described examples are not meant to imply architectural limitations. For example, data processing system **200** also may be a notebook computer or hand held computer in addition to taking the form of a PDA. Data processing system **200** also may be a kiosk or a Web appliance.

The processes of the present invention are performed by processor **202** using computer implemented instructions, which may be located in a memory such as, for example, main memory **204**, memory **224**, or in one or more peripheral devices **226-230**.

With reference now to **Figure 3**, a block diagram of a hardware configuration of a telephone device is depicted in accordance with a preferred embodiment of the present invention. Telephone device **300** includes a processor **302** for controlling operation of the telephone device and a memory **304**. The processor may be a general-purpose microprocessor operating under the control of instructions stored in a memory, such as memory **304**, or device-specific circuitry for controlling the operation of the telephone device. Processor **302** is connected by system bus **306** to

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transmitter **308**, receiver **310**, keypad **314**, display **316**, and audio processor **318**.

Transmitter **308** and receiver **310** are coupled to a telephone signal by couple **324** to provide full duplex communication. Audio processing circuit **318** provides basic analog audio outputs to speaker **320** and accepts analog audio inputs from microphone **322**. Received signals demodulated and decoded by receiver **310**. Transmitter **308** encodes and modulates signals passed to it by processor **302** or audio processor **318**. The output of the transmitter is amplified by power amplifier **312** to control the power level at which the signal is transmitted.

Processor **302** or audio processor **318** may detect audible call status information and call status codes received by receiver **310**. Memory **304** may include a look-up table associating call status information or call status codes with visual call status information, such as text messages. Processor **302** detects or receives a call status code and displays an appropriate call status message on display **316**. Receiver **326** decodes the encoded command transmitted in the signal of the present invention for presentation to processor **302**. This receiver may receive different types of signals depending on the implementation. For example, the signals may be infrared, ultrasonic, or radio frequency. Alternatively, the decoding function implemented in receiver **326** may be located in receiver **310** to receive and decode this control signal.

Those of ordinary skill in the art will appreciate that the hardware depicted in **Figure 3** may vary.

Figure 4 is a block diagram illustrating a method to mitigate the mobile phone nuisance factor in accordance with a preferred embodiment of the present invention.

To implement the present invention in these
5 examples, mobile phones will be designed with a factory programmed "In-Public-Use" profile and means for external activation of the profile. This profile will control the behavior of the mobile phone in public places. For example, public establishment **400** contains transmitter
10 **410**, which broadcasts a constant signal. The signal contains an encoded command that can activate the "In-Public-Use" profiles in mobile phones. For example, mobile phones **420** and **430** enter the range of the signal and the "In-Public-Use" profiles of these phones are
15 activated when the circuitry, or processor instructions, of the mobile phones decode the signal.

When activated, the profile can control the attributes of the mobile phone, such as the ringer, conversation mode, conversation duration, and
20 informational messages. The ringer can be shut off, set to its minimum volume, set to a non-auditable mode, such as vibrate, or the duration of the ring can be limited. The conversation mode can be enabled or disabled so that a call between parties cannot be accomplished. If the
25 "In-Public-Use" profile has been activated in the no conversation mode, it would still allow emergency calls to be placed. Certain numbers such as 911 would be designated as emergency numbers. The duration of a call can also be limited to some preset amount of time, such
30 as 30 seconds. Additionally, a display message, stating that the use of a mobile phone is prohibited in the establishment, could be displayed on the phone.

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5 The "In-Public-Use" profile cannot be activated or modified by the user of the mobile phone according to a preferred embodiment of the present invention. Although depending on the implementation, these profiles may be changed by a user or other authorized person. The profile is activated in the mobile phone when it is in the presence of an external control signal, such as a radio frequency, infrared, ultrasonic, or other control signal. The control signal is generated by a transmitter, such as transmitter **410**, which is located in a public establishment, such as a theater or restaurant. The signal is localized in nature so that it only affects the mobile phone usage in that public place. The signal may be broadcasted within the structure of the public establishment or may include areas outside the structure such as the parking lot of the public establishment. Additionally, areas within the public structure may not broadcast the signal so that the phones may be used as desired in that area. The mechanism of the present invention would allow the establishment to set aside a special area where the control signal is not present thereby allowing normal use of mobile phones in that area analogous to a smoking area in a restaurant.

25 Receiver **326** in telephone device **300** of **Figure 3** may be used to receive the control signal transmitted from transmitter **410**.

30 The control signal will have the capability to select various settings of the profile to reflect the policy desired in that public place. The signal contains an encoded command, which can be decoded by the circuitry, or processor instructions, of the mobile phones in the present invention. Control unit **460** has

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the ability to program the control signal that is
broadcasted by transmitter **410**. The control unit of the
present invention may be a data processing system, such
as data processing system **200** in **Figure 2**, a black box,
5 or any other type of control unit capable of programming
the control signal for the transmitter.

When the mobile phone is out of range of the control
signal it will revert back to its previous mode of
operation. For example, mobile phones **440** and **450** are
10 outside the range of the control signal and would not
have the "In-Public-Use" profile activated. If mobile
phones **420** and **430** leave the range of the control signal
in the public establishment, these mobile phones would
return to their previous mode of operation.

15 Mobile phones **420**, **430**, **440**, and **450** may be, for
example, telephone devices, such as telephone device **300**
in **Figure 3**. Those of ordinary skill in the art will
appreciate that the hardware of the present invention may
vary. The mechanism of the present invention may be
20 applied to any mobile communications device depending on
the particular implementation.

Turning to **Figures 5A - 5C**, block diagrams of three
mobile phones are displayed in accordance with a preferred
embodiment of the present invention.

25 **Figure 5A** shows mobile phone **510** with display **520**.
Display **520** is a typical display for mobile phones, such
as mobile phones **440** and **450** in **Figure 4**, prior to
entering a location with a policy for mobile phone usage.

Figure 5B illustrates mobile phone **530** with display
30 **540**. If mobile phones, such as mobile phones **420** and **430**
in **Figure 4**, enter a public establishment broadcasting an

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external control signal to enforce its policy for mobile phone usage, an "In-Public-Use" icon, such as icon 550, may be displayed. When the profile is activated, the mobile phone will display an icon that indicates that the

5 "In-Public-Use" profile is activated.

Figure 5C illustrates mobile phone 560 with display 570. Mobile phone 560 displays icon 580, which is another example of an icon that may be displayed while the mobile phone is within the range of the external control signal that activates the "In-Public-Use" profile.

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The icon discussed in the present invention may include text or graphics, and may vary with each implementation of the present invention.

Figure 6 is a flowchart of the process for a mobile phone entering a public establishment in accordance with a preferred embodiment of the present invention. This process may be implemented in a mobile phone, such as telephone device 300 in **Figure 3**.

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The process begins when a mobile phone enters a public establishment with a policy for mobile phone usage and the mobile phone detects the external control signal, which is constantly broadcasted within the public establishment (step 610). The process identifies the settings in the external control signal by decoding the command in the signal (step 620). The "In-Public-Use" profile of the mobile phone is activated with the identified settings (step 630). The "In-Public-Use" icon is displayed on the mobile phone (step 640) with the process terminating thereafter.

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Figure 7 is a flowchart of the process for a mobile phone exiting a public establishment in accordance with a

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preferred embodiment of the present invention. This process may be implemented in a mobile telephone, such as telephone device **300** in **Figure 3**.

A determination is made as to whether an external
5 control signal exists (step **710**). This step is used to determine whether to continue to use the "In-Public-Use" profile. If the external control signal exists, the process returns to step **710**. This condition means that the mobile phone is still within range of the transmitter
10 and the profile should continue to be active. If the external signal does not exist, the mobile phone settings are returned to the previous settings prior to entering the public establishment with a policy for mobile phone usage (step **720**). The "In-Public-Use" icon is no longer
15 displayed (step **730**) with the process terminating thereafter.

The present invention presents a way for a public establishment to set a policy governing the operation of mobile phones when located in a public establishment or a
20 public space. It provides advantages and flexibility in the way the mobile phone nuisance problem is handled. Email, SMS, mailbox, and Internet access are still possible with the implementation of the present invention. The present invention allows for an area
25 where normal mobile phone use is possible and for emergency calls to be made in any location. The present invention is configurable, since the location using the present invention can modify the profile to have different behaviors. For example, one public
30 establishment may only desire to mute the ringer whereas another public establishment may want to mute the ringer and prohibit conversation unless in a designated area.

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The present invention is less expensive for a business to implement and does not require approval by a regulating authority to use.

Therefore, the present invention provides an
5 improved method, apparatus, and computer instructions for mitigating the mobile phone nuisance factor.

It is important to note that while the present invention has been described in the context of a fully functioning data processing system, those of ordinary
10 skill in the art will appreciate that the processes of the present invention are capable of being distributed in the form of a computer readable medium of instructions and a variety of forms and that the present invention applies equally regardless of the particular type of
15 signal bearing media actually used to carry out the distribution. Examples of computer readable media include recordable-type media, such as a floppy disk, a hard disk drive, a RAM, CD-ROMs, DVD-ROMs, and transmission-type media, such as digital and analog
20 communications links, wired or wireless communications links using transmission forms, such as, for example, radio frequency and light wave transmissions. The computer readable media may take the form of coded formats that are decoded for actual use in a particular
25 data processing system.

The description of the present invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and
30 variations will be apparent to those of ordinary skill in the art. For example, the illustrations of uses for the mechanism of the present invention are show with respect

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to public establishments. The mechanism of the present invention may be used in any area or situation in which normal mobile phone or other mobile communications device operations are undesirable. The mechanism of the present
5 invention may be applied to other mobile communications devices, such as a PDA, a laptop computer, or a two-way pager. The embodiment was chosen and described in order to best explain the principles of the invention, the practical application, and to enable others of ordinary
10 skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.

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